Project	AlphaDBS System	**Phase**	Post-Production Phase
Subsystem	Overall system	**Document type**	Summary of safety and clinical performance
Doc code	Doc6_SSCP_aDBS_COMP0 PATIENT	**Version number**	5.0
Re-design code	RD [22]	**Feedback number**	FB [11]

AlphaDBS System – System Level

Post-Production Phase – Summary of safety and clinical performance

DOCUMENT REFERENCES	DOCUMENT TYPE	SECURITY	VALIDITY
Doc6_SSCP_aDBS_COMP0 PATIENT.docx	SSCP	Newronika S.p.A.	Valid

DOCUMENT SCOPE

The summary of safety and clinical performance is intended to provide public access to an updated summary of clinical data and other information about the safety and clinical performance of the AlphaDBS System as required by Article 32 of MDR 2017/745.

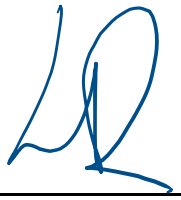
VER.	AUTHOR	REVIEWER	APPROVER	DATE AND SIGN	DESCRIPTION
1.0	C. Conti P. Zacchera C. Petrangeli	T. Campbell K. Drake	L. Rossi	29/06/2023	Obsolete
2.0	L. Thommi	C. Conti	L. Rossi	21/12/2023	Obsolete
3.0	T. Campbell	L. Rossi	L. Rossi	16/01/2024	Obsolete
4.0	C. Petrangeli C. Conti	I. Isaias	L. Rossi	09/08/2024	Obsolete
5.0	P.Raghunandan	L. Rossi	L. Rossi	14/07/2025	Approved

DOCUMENT CONTROL

The intended audience of this document shall be internal Project Manager, Quality Manager and external Project Sponsor and Project Manager.

DISTRIBUTION CONTROLLER

Lorenzo Rossi (can be different by the approver)



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DOCUMENT REVISION HISTORY	
VER.	**CHANGE DESCRIPTION**
1.0	First document release
2.0	Document has been updated.
3.0	Modified according to MDR submission screening review by IMQ (Component Categorization). No material changes to remaining content.
4.0	Updated due to IMQ requests
5.0	Updated to include details about the new catalogue number, accessories and components

Table of Contents

References

[1] Regulation (EU) 2017/745 of the European parliament and of the council on medical devices

[2] Doc4_CER_aDBS_COMP0 – Clinical Evaluation Report

[3] Doc4_RMR_aDBS_COMP0 - Risk Management Report

[4] Doc4_PMCF_aDBS_COMP0 – Post-market Clinical Follow-up plan

[5] MDCG 2019-9 Rev.1 – Summary of safety and clinical performance; a guidance for manufacturers and notified body

Purpose

Articles 32 of the Regulation (EU) 2017/745 on medical devices requires that the manufacturer shall draw up a summary of safety and clinical performance (SSCP) for implantable devices and for class III devices, other than custom-made or investigational devices.

Summary of safety and clinical performance

This Summary of Safety and Clinical Performance (SSCP) is intended to provide public access to an updated summary of the main aspects of the safety and clinical performance of the device.

This SSCP is not intended to replace an Implant card or the Instructions for Use to provide information on the safe use of the device.

The SSCP is not intended to provide diagnostic or therapeutic suggestions to intended users or patients.

Please contact your healthcare professional in case you have questions about your medical condition or about the use of the device in your situation.

The information presented below is intended for patients or lay persons.

Readability

The SSCP has one part for intended users/healthcare professionals, and a second part for patients. It provides clear information at an appropriate depth to reflect the healthcare professionals' and the patients' different levels of knowledge. The readability of the part of the SSCP intended for patients is assessed by a test given to lay persons.

The readability was assessed by providing the document to laypersons with different literacy background to read. All the laypersons who have read the document was able to understand the terms and details of the device properly. Also, they agreed that the document language was legible and understandable. The manufacturer used this method to confirm that the SSCP was written clearly to the patient. Medical terminology, relevant for the medical device and the clinical context, is used consistently throughout the part of the SSCP that is intended for healthcare professionals.

The conformity assessment has been evaluated and approved by the Notified Body based on the equivalence with a legacy device.

1. Device identification and general information

1.1. Devices trade names

Device category	Catalogue number (REF)	Trade name	Trade mark
Implantable neurostimulator and related accessories	AlphaDBSipg MV	AlphaDBSipg	αDBS Newronika
Implantable neurostimulator and related accessories	AlphaDBSipg DV	AlphaDBSipg	αDBS Newronika
Implantable neurostimulator and related accessories	AlphaDBSext	AlphaDBSext	αDBSext
Implantable neurostimulator and related accessories	NWKstation	NWKstation	αDBSnwkstation
Implantable neurostimulator and related accessories	AlphaDBSpat HP	AlphaDBSpat	αDBSPat
Implantable neurostimulator and related accessories	AlphaDBSpat LP	AlphaDBSpat	αDBSPat
Implantable neurostimulator and related accessories	AlphaDBS Screw Driver MV	AlphaDBS Screw Driver	/
Implantable neurostimulator and related accessories	AlphaDBS Screw Driver DV	AlphaDBS Screw Driver	/

Implantable neurostimulator and related accessories	AlphaDBSlink	AlphaDBSlink	αDBS Link

In this document

AlphaDBS System or AlphaDBS	Refers to the AlphaDBS Implantable Neuro Stimulators and related accessories as listed above
AlphaDBSipg	Refers to both the REF; AlphaDBSipg DV and AlphaDBSipg MV
AlphaDBSpat	Refers to both REF; AlphaDBSpat LP and AlphaDBSpat HP
AlphaDBS Screw Driver	Refers to both the REF; AlphaDBS Screw Driver DV and AlphaDBS Screw Driver MV

1.2. Manufacturer's name and address

Manufacturer identification: Newronika S.p.A.
Legal Office: Foro Buonaparte 57, 20121 Milano (MI) - Italy
Operative Labs: Via T. Tasso 1, 20093 Cologno Monzese (MI) - Italy
Tel: (+39) 02 8410 9381
Fax: (+39) 02 9287 8462
Website: www.newronika.com

1.3. Manufacturer's single registration number (SRN)

Manufacturer's SRN: IT-MF-000035433

1.4. Basic UDI-DI

The Basic UDI-DI codes as referred to in Part C of Annex VI of MDR 2017/745 assigned by Newronika to the AlphaDBS are the following:

Basic UDI-D1	AlphaDBSipg MV	805848093IPGMVKQ
	AlphaDBSipg DV	805848093IPGDVJV
	AlphaDBSext	805848093EXTR8
	NWKstation	805848093NWKSTQ2
	AlphaDBSpat HP	805848093PATHPL2

	AlphaDBSpat LP	805848093PATLPLE
	AlphaDBS Screw Driver MV	805848093SDMVM4
	AlphaDBS Screw Driver DV	805848093SDDVL9
	AlphaDBSlink	805848093LINKKR

1.5. Medical device nomenclature

European Medical Device Nomenclature (EMDN) code:

- J02010101 - DEEP BRAIN STIMULATION (DBS) IMPLANTABLE NEUROSTIMULATORS, RECHARGEABLE

1.6. Class of device

Device classification: Class III as per MDR 2017/745 of Annex VIII, Rule No.8, 9 and 22

1.7. Year when the first certificate (CE) was issued covering the device

February 11th, 2021.

1.8. Authorized representative

The Newronika SpA is a European based company located in Italy. Therefore, Newronika SpA manufacturing AlphaDBS System does not require a European Authorized Representative.

1.9. Notified body's (NB) name and the NB's single identification number

Notified body: IMQ S.p.A.
Via Quintiliano 43 - 20138 Milano - Italia
Tel: (+39) 02 50 73 1
Fax: (+39) 02 50 99 15 00
Website: www.imq.it
Email: info@imq.it

NB identification number: 0051

2. Intended purpose of the device

2.1. Intended Purpose

AlphaDBS Implantable neurostimulators and related accessories are intended for conventional or adaptive deep brain stimulation (DBS) as an adjunctive therapy to reduce symptoms of levodopa-responsive Parkinson's Disease (PD) that are not adequately controlled by medications.

2.2. Indications and target population

Indications for use

AlphaDBS is indicated for the management of Parkinson Disease (PD) symptoms such as tremor, rigidity, bradykinesia/akinesia and dyskinesia.

Intended patient population

The target population of the AlphaDBS consists of patients with levodopa-response Parkinson's disease who are not adequately controlled by medications. The target population is the same as for conventional DBS treatment.

Contraindications

The implantation of AlphaDBS is contraindicated in the following cases:

- For patients in whom trial stimulation is ineffective.
- For patients who are unable to make the system work properly.
- Diathermic therapy. Patients with a neurostimulation system should not be subjected to shortwave diathermy, microwave diathermy or therapeutic ultrasound diathermy (collectively referred to as 'diathermy'). The energy generated by diathermy can cross the implanted system and cause tissue damage at the site of implant, causing serious injury or death of the patient. Such injuries or damage may occur during diathermic treatment regardless of whether the neurostimulation system is switched on or off. All patients are advised to inform their doctor about the inability to expose themselves to diathermic treatment.
- Magnetic resonance imaging (MRI). Patients implanted with AlphaDBS should not undergo MRI. Since the magnetic resonance imaging energy can be transferred through the implanted system, there is the possibility of generating heat at the point where the electrodes are placed. This isolated rise in temperature can cause tissue damage at the electrode implantation site, resulting in serious injury or death of the patient. Injuries may occur during magnetic resonance treatment regardless of whether the neurostimulation system is switched on or off. All patients are advised to inform their physician of the inability to undergo magnetic resonance imaging (MRI).

Safety warnings

- Intracranial Hemorrhage. Special precautions should be taken for patients who are prone to hemorrhage including patients with coagulopathy, with high blood pressure, or who are using prescribed anticoagulants. Microelectrode penetration and DBS Lead insertion can put patients who have a likelihood of intracranial hemorrhages at greater risk.
- Electromagnetic Interference. Strong electromagnetic fields can potentially turn AlphaDBSipg off, cause temporary unpredictable changes in stimulation, or interfere with AlphaDBSpat or NWKstation communication. Patients should be counseled to avoid or exercise care around:
    - Theft detectors such as those used at entrances/exits of department stores, libraries, and other public establishments. The patient should proceed with caution, ensuring to move through the center of the detector as quickly as possible.
    - Security screeners, such as those used in Airport Security or at entrances to government buildings, including hand-held scanners. The patient should request assistance to bypass the device. If the patient must pass through the security screener, they should move quickly through the device staying as far from the physical device as allowable.
    - Power lines or power generators.
    - Electric steel furnaces and arc welders.
    - Large magnetized stereo speakers.
    - Strong magnets.
    - Automobiles or other motorized vehicles using a LoJack system or other anti-theft systems that can broadcast a radio frequency (RF) signal.
    - Other sources of electromagnetic interference, such as RF transmitters at television or radio broadcast stations or transceivers.
- Therapeutic Ionizing Radiation. Electronic components in AlphaDBSipg can be damaged by therapeutic ionizing radiation. Any damage to the implanted part of the AlphaDBSipg might not be immediately detectable.
- Heat Due to Charging. The charger, AlphaDBSpat, may become warm while charging the Stimulator. The Charger should be handled with care. The Patient should not charge while sleeping. This may result in a burn. If the patient experiences pain or discomfort, they should cease charging and contact their physician.
- Stimulator Damage. Chemical burns may result if the Stimulator housing is ruptured or pierced, exposing the patient's tissue to battery chemicals. Do not implant the AlphaDBSipg Stimulator if the housing is damaged.
- Suicide. Depression, suicidal ideation, and suicide are risks previously reported in relation to DBS. If the patient reports depression or suicidal thoughts, consider

adjustment of stimulation, discontinuing stimulation, adjusting medication, and/or psychiatric referral.

- Other Active Implantable Devices. Stimulators, such as the AlphaDBSipg, may interfere with the operation of implanted sensing stimulation devices such as pacemakers or cardioverter defibrillators. The effects of implanted stimulation devices on the neurostimulator AlphaDBSipg are unknown.
- Automobiles and Equipment. Patients should operate automobiles, other motorized vehicles, or potentially dangerous machinery/equipment with caution after receiving the AlphaDBS. Performing activities that would be dangerous if treated symptoms were to return, or instances in which stimulation changes occur, should be avoided.
- Pregnancy It is unknown whether this device may hurt an unborn baby.

Precaution

Physician training is required for usaging of the AlphaDBS. The implanting physician should be experienced in Stereotactic and Functional Neurosurgery. The following is a list of precautions that should be taken when implanting or using the AlphaDBSipg.

- Connections. Before inserting DBS Extension into any connector or header ports, including the AlphaDBSipg Hader, DBS Extension connectors, and operating room cable assembly, always wipe the connections with a dry cotton sponge. Contamination inside the ports may be difficult to remove and can cause high impedances, preventing electrical connectivity which may compromise the integrity of the stimulation circuit.
- Components. The use of components other than those supplied by Newronika and intended for use with the AlphaDBS may: damage the system, diminish the effectiveness of therapy, and/or put the patient at unknown risk
- Excess DBS Extension. Coil excess DBS Extension around or below the AlphaDBSipg. Excess wire on top of the Stimulator may increase the potential for tissue erosion or damage during Stimulator replacement surgery and may interfere with charging
- Other Models of External Devices. Only the NWKStation, AlphaDBSext, and AlphaDBSpat that were provided with the Newronika AlphaDBS should be used. Other models of these devices will not function with the AlphaDBS
- Stimulator Orientation. To ensure proper charging, orient the Stimulator parallel to the skin surface and at a depth less than 1 cm below the skin. The etched writing “This Face Up” must be facing out of the pocket towards the patient’s skin. Suboptimal placement of the Stimulator may result in the inability to recharge and/or a revision surgery.
- Setscrews. Before tightening Setscrews, always test impedance to confirm electrical connectivity. Tightening a Setscrew onto a contact may damage the contact and may result in the need to replace the DBS Lead Extension

- Device Failure. Implants can fail at any time due to random component failure, loss of battery functionality, or component breakage. Suddenly stopping brain stimulation can cause serious reactions to develop. If the Stimulator stops working even after complete charging, patients should be instructed to turn off the Stimulator and contact their physician immediately so that the system can be evaluated and appropriate medical care given to manage the return of symptoms.
- Tissue Reaction. Temporarily, there may be some pain in the area of the Stimulator as the incisions heal. If there is excessive redness around the wound area, it should be checked for infection. In rare cases, adverse tissue reaction to implanted materials can occur
- Cell Phones. While interference with cell phones is not anticipated, the full effects of interaction with cell phones are unknown at this time. Advice patient to not place cell phone in his/her shirt pocket or directly on components of AlphaDBS. If some interferences happen, place cell phone on the other hear or turn off cellular
- Patient Activities. During the two weeks following surgery, it is important for the patient to exercise extreme care so that appropriate healing will secure the implanted components. During this period, the patient should not attempt to move heavy objects. Instruct the patient to restrict head movements, including extension or flexion of the neck and rotation of the head, until healing is complete
- Massage Therapy. Patients should avoid receiving massage therapy near the implanted system components. If a patient does receive massage therapy, the patient should inform the masseuse that they have an implanted device and show him/her where the Stimulator, DBS Extension, and DBS Leads are located. The patient should have the masseuse avoid these areas and proceed with caution
- Environmental Precautions. Patients should avoid activities that could potentially involve large amounts of electromagnetic interference. Devices that contain permanent magnets, such as speakers, should not be placed near the Stimulator or other parts of AlphaDBS because they may cause the system to turn on or off
- Medical Devices/Therapies. The AlphaDBSipg, also if the stimulation is turned off, could be associated to injuries to the patient or damages to the neurostimulator itself in case of:
    - Electrocautery – Electrocautery can transfer destructive current into the DBS Leads and/or Stimulator.
    - Lithotripsy – High frequency signals directed near the neurostimulator may damage circuitry.
    - Radiation Therapy – Lead shielding should be used over the Stimulator to prevent damage from high radiation. Any damage to the device by radiation may not be immediately detectable.
    - Transcranial Stimulation – Safe use of electromagnetic therapies, such as transcranial magnetic stimulation, have not been established.
    - External Defibrillation

  - Ultrasound (US)
- If any of the above is required by medical necessity, the procedure(s) should be performed with the stimulation off and as far from the implanted components as possible. After having used one of the previous medical therapies, it is necessary to check functionalities of AlphaDBipg through NWKstation, trying to reset stimulation parameters and to measure impedance.
- Inspect packaging before use. Check the expiration date on the package before opening the sterile package and using the contents. Do not use the contents if the current date is past the expiration date, if the package is opened or damaged, or if contamination is suspected because of a defective sterile package seal.
  - Inspect the seal integrity of the outer tray before use.
  - Open the inner tray in the sterile field.
  - If the Stimulator was dropped, do not implant it in a patient. The dropped Stimulator may have lost sterility, experienced a loss of hermeticity, or been otherwise damaged. Replace the dropped Stimulator with a new, sterile Stimulator prior to implantation. Return the damaged Stimulator to Newronika.
  - Do not use any component that shows signs of damage.
  - Do not use if “Use By” date has expired
- AlphaDBS shall be used exclusively with certified intracranial electrodes.
- In the case of any malfunctioning, please immediately contact the manufacturer.
- AlphaDBS maintenance can be done only by the manufacturer.
- To avoid unintended stimulation, do not modify the operating system in any way. Do not use the application if the operating system has been compromised (jailbroken).
- Do not use AlphaDBS with sharp objects (pens, pencils, screwdrivers).
- Keep AlphaDBS away from kids in order to avoid asphyxiation and strangulation dangers.
- Inform the specialized staff when DBS is used in patients with other implanted devices, such as pacemakers, intracranial electrodes, defibrillators, or any other prosthesis.
- The use of device shall agree with the indications reported in the present manual. Do not use AlphaDBS in a different manner.

Adverse Events

If any of these events occur, you should contact your physician as soon as possible to inform them.

The following is a list of known risks associated with the use of DBS treatment of Parkinson’s disease. Note that some of these symptoms may be resolved or reduced by

current steering, changing stimulation parameters, or by changing the position of the lead during surgery.

Risks Associated with Surgical Procedure and Post-Operative Period

- Allergic reaction to anesthesia or antibiotics including anaphylaxis. Anesthesia/neurosurgery risks, including unsuccessful implant, exposure to bloodborne pathogens.
- Embolism, including air embolism and pulmonary embolism.
- Hemorrhagic or ischemic stroke, immediate or delayed, which could result in temporary or permanent neurologic deficits such as muscle weakness, paralysis or aphasia.
- Injury to tissues adjacent to implant or within surgical field, such as blood vessels, peripheral nerves, brain (including pneumocephalus), or pleura (including pneumothorax).
- Blood clot formation in the extremities (e.g., in the veins of the legs).
- Blood clot or air forming in or traveling through the blood stream, which can block blood flow to parts of the lungs or other tissue that could be life-threatening.
- Confusion or problems with attention, thinking, or memory (acute or chronic).
- Death.
- Fibrosis (thickened skin and scarring) around the lead extension (including tightening, tethering, and bowstringing).
- Hemiparesis (muscular weakness or partial paralysis on one side of the body). Hemiballism (uncontrollable involuntary movements of a limb or limbs on one or both sides of the body).
- Intracranial hemorrhage (which can lead to stroke, paralysis, or death).
- Intraparenchymal cyst.
- Infection.
- Injury to areas next to the implant, such as blood vessels, nerves, the chest wall, and the brain.
- Injury to the nerves in the armpit (brachial plexus) leading to pain or weakness of the arm or hand.
- Neurosurgery/anesthesia risks, including unsuccessful implant and pneumonia.
- Pain at the surgical site(s), headache or discomfort.
- Seizures. • Speech or language difficulties.
- Subcutaneous hemorrhage or seroma.
- Stroke.
- Swelling or bruising of the muscles or skin in the area of the lead or of the IPG implant.

Possible Side-Effects of Stimulation

- Confusion or problems with attention, thinking, or memory.
- Gait difficulty (trouble walking) and falls.
- Pain, headache or discomfort.
- Pneumonia from difficulty with swallowing or from inhaling fluid.
- Psychiatric disturbances such as anxiety, depression, lessened interest or emotion, hypersexuality, aggression, mania or hypomania, psychosis, emotional sensitivity, sleep problems, suicide, or suicidal thoughts or attempts.
- Mentation impairment such as attention or cognitive deficits, memory disturbances, or confusion.
- Seizures.
- Sensory changes.
- Speech or language problems.
- Swallowing difficulty such as dysphasia, dysarthria or dysphagia, as well as complications of dysphagia such as aspiration pneumonia.
- Systemic effects such as rapid heartbeat, sweating, fever, dizziness, changes in kidney function, difficulty passing urine, sexual effects, nausea, difficulty having bowel movements, bloating.
- Weakness, muscle spasms, shaking, restlessness, or problems with movement.
- Undesirable sensations (e.g., tingling).
- Visual disturbances or periorbital symptoms, such as diplopia, eyelid movement difficulty, oculomotor difficulties or other visual field effects and eye-related symptoms.
- Weight changes

<u>Device-Related Risks</u>

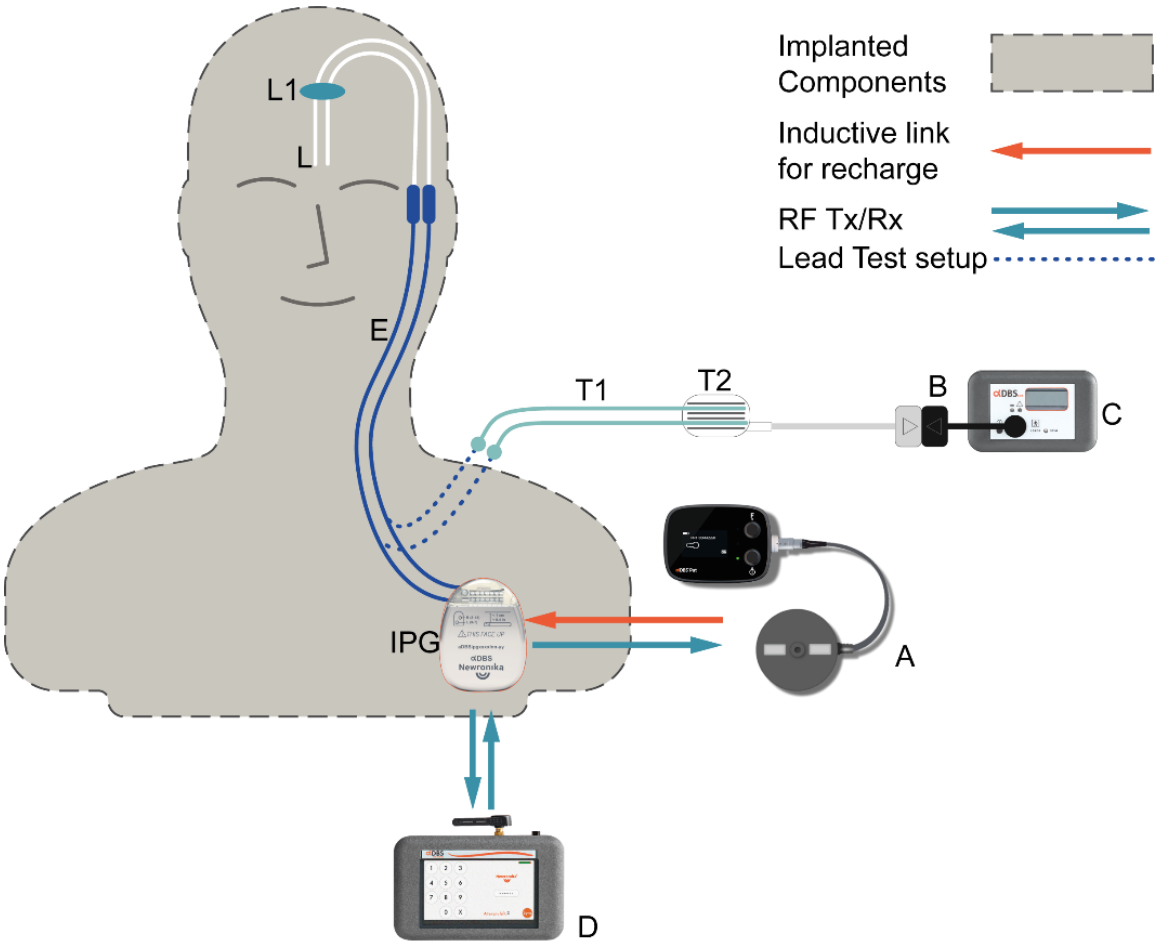
- Allergic or immune system response to implanted materials.
- Failure or malfunction of any part of the device, including but not limited to: Battery leakage, battery failure, lead or extension breakage, hardware malfunctions, loose connections, electrical shorts or open circuits, and lead insulation breaches, whether or not these problems require device removal and/or replacement.
- Implant site complications such as pain, poor healing, redness, warmth, swelling or wound reopening.
- Implanted neurostimulator may be cause skin erosion and/or move from original implanted location, which may lead to the need for additional surgery.
- Infection.
- Interference from external electromagnetic sources.
- Loss of adequate stimulation.
- Pain, headache or discomfort.
- Skin irritation or burns at the stimulator site.

- Stiffness in muscles or joints or worsening of disease symptoms, potentially caused by loss of stimulation, medication changes, surgery, or illness. In rare cases worsening can become a life-threatening crisis associated with varied symptoms such as mental status changes, fever, and muscle rigidity.
- Swelling, including fluid collecting around the device.

Note:

In case of reappearance of PD symptoms, pain/swelling in the area of the device implant or in case of any new symptom or for any other problems the patient should immediately contact the treating physician.

3. Device description



The AlphaDBS System and Components (does not include implantable leads, lead extensions or trialing cable). (A. AlphaDBSpat, B. AlphaDBS Adapter Plug, C. AlphaDBSext, D. NWKstation, E. Lead Extensions (Medtronic), L. Lead Electrodes (Medtronic), L1. Leads (Medtronic), T1. Externalized leads extensions (Medtronic), T2. Multi-lead Trialing Cable

This neuromodulation system is designed to deliver electrical impulses to nerve structures, and to simultaneously record and analyse neurophysiological signals AlphaDBS System also features algorithms that automatically vary stimulation parameters according to changes in input signals when programmed in adaptive mode. AlphaDBSipg is intended to be used with leads and associated extensions that are compatible with them.

Differently from other systems for Deep Brain Stimulation (DBS) on the market, the AlphaDBS Implantable neurostimulator can be programmed with two different types of stimulation: conventional DBS (cDBS), which is implemented also by other DBS systems, and adaptive

DBS (aDBS) that automatically adjusts the energy delivered to patient using a biosignal, local field potential (LFP), in a closed-loop configuration.

The AlphaDBS System is composed of different components, and accessories that can be used in conjunction.

Catalogue Number	Trade Name	Photograph	Description
AlphaDBSipgMV	AlphaDBSipg		Implantable pulse generator that both delivers chronic stimulation and records and analyzes the neuronal signals coming from the leads to adapt stimulation parameters AlphaDBSipgMV is designed to be compatible with the Medtronic leads (model 3389 and extensions model 37086). This is a single use sterile device, sterilized by Ethylene Oxide.

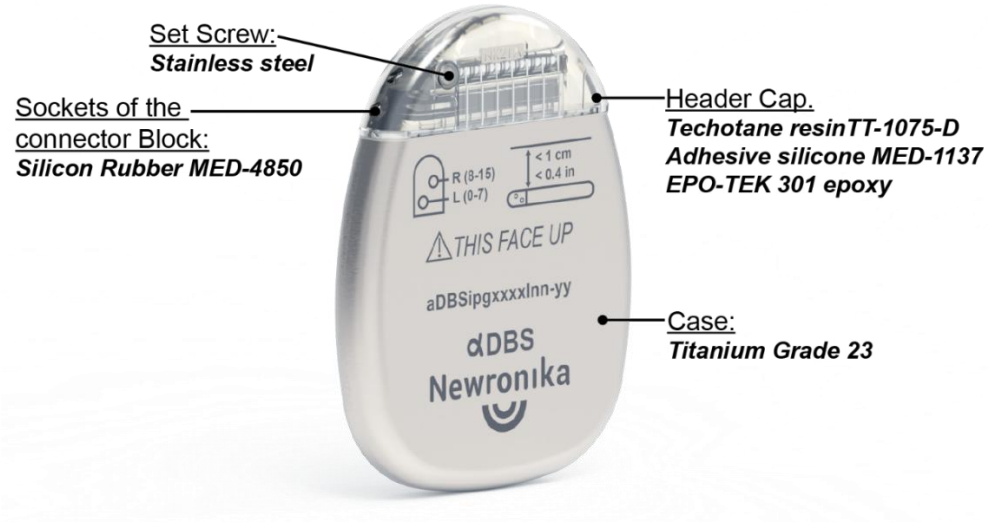
AlphaDBSipg DV	AlphaDBSipg		Implantable pulse generator that both delivers chronic stimulation and records and analyzes the neuronal signals coming from the leads to adapt stimulation parameters AlphaDBSipgDV is designed to be compatible with Abbott leads (Model 6170-6172) and Abbott extensions (Model 6371). This is a single use sterile device, sterilized by Ethylene Oxide.
Accessories			
AlphaDBSpatHP	AlphaDBSpat		External controller that allows the patient to interact with AlphaDBSipg and to recharge it. The AlphaDBSpatHP is able to recharge the AlphaDBSipg through an inductive coil and to exchange

			information via radiofrequency with the AlphaDBSipg about its status and activity. When the patient wants to recharge its AlphaDBSipg, the user shall place the devices above the AlphaDBSipg implanted area
AlphaDBSpatLP	AlphaDBSpat	 	External controller that allows the patient to interact with AlphaDBSipg and to recharge it. The AlphaDBSpatLP is able to recharge AlphaDBSipg through an inductive coil and to exchange information via radiofrequency with AlphaDBSipg about its status and activity. When the patient wants to recharge its AlphaDBSipg, he/she shall place the devices above

			AlphaDBSipg implanted area
NWKstation	NWKstation		External device that allows the physician to program both AlphaDBSext and AlphaDBSipg
AlphaDBSext	AlphaDBSext		External pulse generator that measures the impedance of the implantable leads at the electrode contacts level during surgical procedures
AlphaDBS Screw Driver MV	AlphaDBS Screw Driver		Single-use accessory used during IPG implantation to fix leads extensions to AlphaDBSipg MV header using the stainless-steel screws. This is a single use sterile device,

			sterilized by Ethylene Oxide.
AlphaDBS Screw Driver DV	AlphaDBS Screw Driver		Single-use accessory used during IPG implantation to fix leads extensions to AlphaDBSipg DV header using the stainless-steel screws. This is a single use sterile device, sterilized by Ethylene Oxide.
AlphaDBSlink	AlphaDBSlink		AlphaDBS Link is an external device that enables communication between the AlphaDBSipg and an external Bluetooth programming interface (AlphaDBSpad) by serving as a transdecoder. It also connects the AlphaDBSipg with AlphaDBSstim, a mobile app that is installed on AlphaDBSpad.

3.1 Material/substances in contact with patient tissues



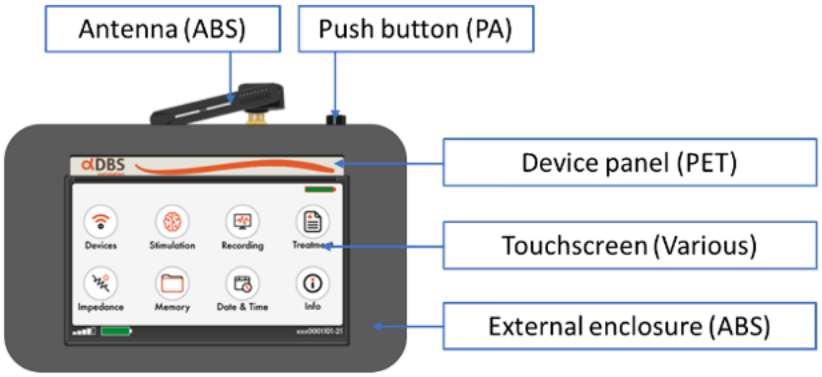
AlphaDBSipg external components in contact with the body

Component	Component material	% in the item	Contact type	Contact site	Contact Duration
Top/Bottom Enclosure	Titanium Grade 23 6 Al- 4V ELI	87.77%	Direct	Subcutaneous	Long-term
Header Insert	Tecothane resin TT- 1075D-M	0.4%	Direct	Subcutaneous	Long-term
Header Cap	Tecothane resin TT- 1075D-M	7.17%	Direct	Subcutaneous	Long-term
Header Insert Plug	Implantable silicone MED- 4850	0.41%	Direct	Subcutaneous	Long-term
Septum (Seal Plug)	Implantable silicone MED-4850	0.16%	Direct	Subcutaneous	Long-term
Connector block	316L stainless steel	0.20%	Direct	Subcutaneous	Long-term
Set screw	316L stainless steel	0.80%	Direct	Subcutaneous	Long-term
Glue	MED-1137	Variable	Direct	Subcutaneous	Long-term
Glue	EPOTEK 301 epoxy	Variable	Direct	Subcutaneous	Long-term

RF antenna	90/10 Platinum/Iridium	NA	None	NA	N/A
Secondary cell battery	Titanium 6Al-4V	NA	None	NA	N/A
BalSeal connector	Nickel-Cobalt base alloy (MP35N)	NA	None	NA	N/A
BalSeal seal	Implantable Silicone MED-4850	NA	None	NA	N/A
BalSeal spring	Platinum-iridium alloy (proportion 80%-20%)	NA	None	NA	NA
Bipolar feedthrough, short	90/10 Platinum/Iridium	NA	None	NA	NA
Multipolar feedthrough, short	90/10 Platinum/Iridium	NA	None	NA	NA
Bipolar feedthrough, long	90/10 Platinum/Iridium	NA	None	NA	NA
Multipolar feedthrough, long	90/10 Platinum/Iridium	NA	None	NA	NA
Lidthrough plate, 8mm	Titanium Grade 2	NA	None	NA	NA
Nest top	Polypropylene	NA	None	NA	NA
Nest bottom	Polypropylene	NA	None	NA	NA
Ground pin	90/10 Platinum/Iridium	NA	None	NA	NA
Xray ID tag	Commercially Pure Tungsten	NA	None	NA	NA
Final PBC assy	Various	NA	None	NA	NA

*External components in contact with the body are the same for AlphaDBSipg DV model.

a) NWKStation

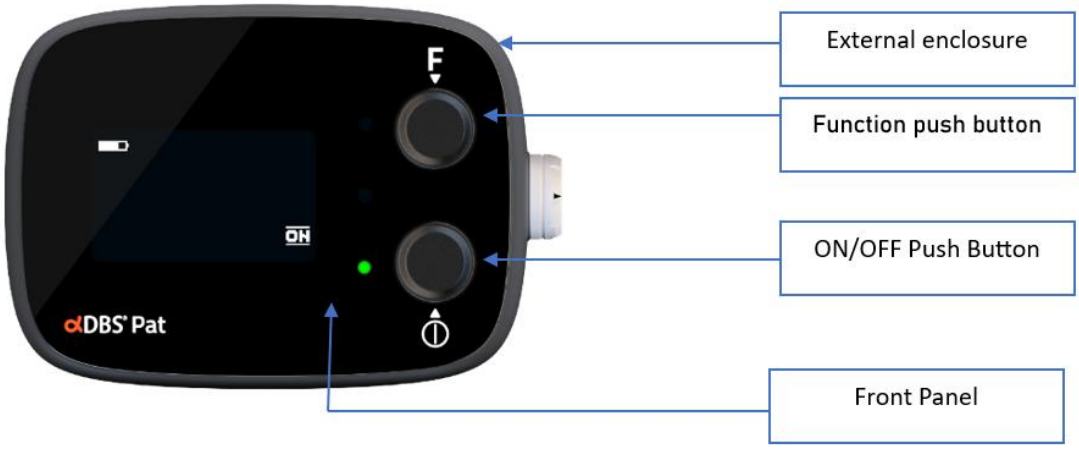


The external enclosure of NWKstation is made of acrylonitrile butadiene styrene (ABS) while the device front panel is made of polyethylene terephthalate (PET). Minor components that constitute the external touchable parts are made of polyamide and polysulfone (PSU) used for push button and power supply connector respectively. NWKpower supply is made of Polyphenylene Ether (PPE) used for the enclosure and of thermoplastic polyurethane (TPU) used for NWKpower cable and ferrite sheath. The NWKpower plugs are made of stainless steel. List of raw materials of the NWKstation and its accessories are reported below.

Component	Material	Type of contact and user	Frequency of usage
External enclosure	Acrylonitrile butadiene styrene (ABS UL 94 HB)	Handled by physician wearing gloves; No patient contact	Handled for maximum one hour during treatment setting
Touch screen	Various	Touched by physician wearing gloves; No patient contact	Touched for maximum one hour during treatment setting
ON/OFF push button	Polyamide	Pushed by physician wearing gloves; No patient contact	One touch for turning on and off the device
Antenna	Acrylonitrile butadiene styrene (ABS)	Touched by physician wearing gloves; No patient contact	Eventually touched to improve connection if needed

Device front and upper panels	Polyethylene terephthalate (PET - Vivak®)	Handled by physician wearing gloves; No patient contact	Handled for maximum one hour during treatment setting
Power supply connector	Polysulfone (PSU)	Touched during power connection by physician wearing gloves	Touched when power is connected to the device
NWKpower supply	Polyphenylene Ether (PPE)	Touched during power connection by physician wearing gloves	Touched when power is connected to the device
NWKpower cable	Thermoplastic polyurethane (TPU)	Touched during power connection by physician wearing gloves	Touched when power is connected to the device
Ferrite sheath	Thermoplastic polyurethane (TPU)	Touched during power connection by physician wearing gloves	Touched when power is connected to the device
NWKpower plugs	Stainless steel	Touched during power connection by physician wearing gloves	Touched when power is connected to the device

b) AlphaDBSpat



The case of AlphaDBSpat is realized in polyamide PA6 with short carbon fiber (nylon ONYX FR®) while the device front panel is made of polyethylene terephthalate (PET). Minor components that constitute the external touchable parts are made of polyamide and polysulfone (PSU) used for push buttons and power supply connector respectively. PATpower supply is made of Polyphenylene Ether (PPE) used for the enclosure and of thermoplastic polyurethane (TPU) used for PATpower cable and ferrite sheath. The NWKpower plugs are made of stainless steel.

Recharger unit cable is made of polyvinyl chloride (PVC) used for the flexible cable, polysulfone (PSU) used for power supply/recharger unit plug, thermoplastic polyurethane elastomer (TPU - Desmopan® 786) used for the black sheath on the power supply, for the sheath on the recharger unit side and for the sheath on the ferrite. The magnet through which the device can be reset is made of polyamide PA6 with short carbon fiber (ONYX FR®).

AlphaDBSpat and its parts/accessories (i.e. AlphaDBS T-shirt, AlphaDBS Harness) are handled and worn by patient only.

During its use, the device is placed into the AlphaDBS Harness or into the AlphaDBS T-shirt and so there will be no direct or indirect contact of the device with the patient. AlphaDBS Harness, AlphaDBS T-shirt and

AlphaDBS Harness and AlphaDBS T-shirt are made by materials that are commonly use in textile application for clothing with low risk of irritations and allergic reactions (tested per Standard 100 by OEKO-TEK).

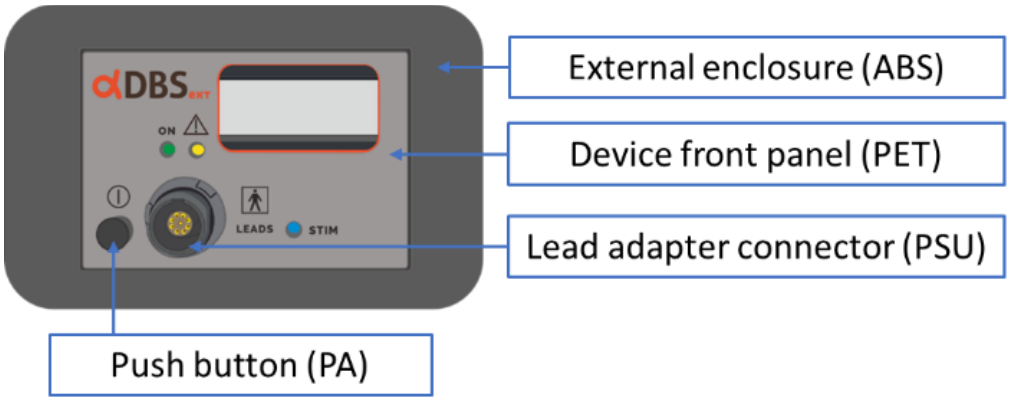
List of raw materials of the AlphaDBSpat and its accessories are reported below:

Component	Material	Type of contact and user	Frequency of usage
External enclosure	Polyamide PA6 with short carbon fiber (ONYX FR®)	Handled by patient during recharging process	Handled for maximum one hour during daily recharge session
ON/OFF push button	Polyamide	Pushed by patient when the device is turned ON/OFF	One touch for turning on and off the device
Function push button	Polyamide	Eventually, pushed by patient to change stimulation modality	One touch for changing stimulation modality
Front panel	Polyethylene terephthalate (PET - Vivak®)	Handled by patient during recharging process	Handled for maximum one hour during daily recharge session
Power supply/recharger unit connector*	Polysulfone (PSU)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging
Power supply/recharger unit plug*	Polysulfone (PSU)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging
Recharger unit cable*	Polyvinyl chloride (PVC)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging
Ferrite sheath	Thermoplastic polyurethane elastomer (TPU - Desmopan® 786)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging
Black sheath on plug connector - (Power Bank side)	Thermoplastic polyurethane elastomer (TPU - Desmopan® 786)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging

Black sheath on plug connector - (Power supply/Recharger Unit side)	Thermoplastic polyurethane elastomer (TPU - Desmopan® 786)	Touched by patient during cable connection	Touched every time the cable is plugged for recharging
PATpower supply	Polyphenylene Ether (PPE)	Touched by patient during power connection	Touched when power is connected to the device / about once every 3 days
PATpower cable	Thermoplastic polyurethane (TPU)	Touched by patient during power connection	Touched when power is connected to the device/ about once every 3 days
Ferrite sheath	Thermoplastic polyurethane (TPU)	Touched by patient during power connection	Touched when power is connected to the device/ about once every 3 days
PATpower plugs	Stainless steel	Touched by patient during power connection	Touched when power is connected to the device/ about once every 3 days
PATreset Magnet - external enclosure	Polyamide PA6 with short carbon fiber (ONYX FR®)	Eventually touched by patient in case of reset	Touched only when needed
AlphaDBS Harness	Polyester (50%), Polyamide (45%), Polyurethane (5%)	Wear by patient during recharging process	Wear for maximum one hour during daily recharge session
AlphaDBS T- Shirt	Polyammide (24%), Polipropilene Dryarn (68%), Elastan (8%)	Wear by patient during recharging process	Wear for maximum one hour during daily recharge session

*Valid for AlphaDBSpat HP and AlphaDBSpat LP

c) AlphaDBSext



The external enclosure of AlphaDBSext is made of acrylonitrile butadiene styrene (ABS) while the device front panel is made of polyethylene terephthalate (PET). Minor components that constitute the external touchable parts are made of polyamide and polysulfone (PSU) used for push button and connector respectively. List of raw materials of the AlphaDBSext and of AlphaDBS Adapter Plug are reported in below:

Component	**Material**	**Type of contact and user**	**Frequency of usage**
External enclosure	Acrylonitrile butadiene styrene (ABS)	Handled by physician wearing gloves; No patient contact	Maximum 30 minutes / implant procedure
Device front panel	Polyethylene terephthalate (PET - Vivak®)	Handled by physician wearing gloves; No patient contact	Maximum 30 minutes / implant procedure
Push button	Polyamide	Pushed by physician wearing gloves; No patient contact	One touch for turning on and off the device
Lead adapter connector	Polysulfone (PSU)	Touched during cable connection by physician wearing gloves; No patient contact	Touched when cables are connected and disconnected

d) AlphaDBS Screw Driver

The AlphaDBS Screw Driver consists of a plastic handle and a hex shaft: the plastic handle is made of Sabic Ultem HU1000 (unreinforced amorphous polyetherimide (PEI) resin), while the screw drivers hex shaft is made of Stainless Steel 420B (tempered).

List of raw materials are reported in table below:

Component	Material	Type of contact and user	Frequency of usage
Screw Driver Handle	Plastic component: Sabic Ultem HU1000 (unreinforced amorphous polyetherimide (PEI) resin	Handled by physician wearing gloves; No patient contact	Few minutes during implant procedure, to lock DBS extension into AlphaDBSipg
Driver's hex shaft	Stainless Steel 420B (tempered)	Handled by physician wearing gloves; No patient contact	Few minutes during implant procedure, to lock DBS extension into AlphaDBSipg
Inner components	Stainless Steel 316L	No physician contact; No patient contact	N/A

Valid for AlphaDBS Screw Driver MV and AlphaDBS Screw Driver DV

3.2 Information about medicinal substances in the device

The Newronika SpA product AlphaDBS System does not incorporate a medicinal product or a medicinal product derived from human blood or human plasma.

3.3 Description of how the device is achieving its intended mode of action

AlphaDBS is a DBS system that includes the possibility for the neurologist to program the stimulation in conventional mode (cDBS) or in adaptive, closed-loop, mode (aDBS). When AlphaDBS is used in aDBS mode, it delivers DBS stimulation using an intelligent biofeedback mechanism which automatically modulates the delivery of electricity. AlphaDBS is able to record and analyze real-time LFPs while DBS in ON from the same implanted lead, and to automatically adjust the current delivered to the patient's brain target. Both modes are intended to manage tremor, rigidity, and bradykinesia/akinesia, as well as

dyskinesia associated with PD. Both cDBS and aDBS involve the stereotactic neurosurgical implant of leads, surgical procedures, and mechanical/biocompatibility properties of the implanted devices. The difference between aDBS and conventional DBS resides in how the electrical stimulation is delivered:

- cDBS: a high-frequency stimulus (range: 100-180 Hz) is delivered continuously with fixed parameters until the physician, during a follow-up visit, decides to change them;

- aDBS: a high-frequency stimulus (range: 100-180 Hz) is delivered automatically adapting the stimulation parameters, within an acceptable range established by the physician, to the patient's clinical state, according to the recording of neuronal signals obtained from the same implanted electrodes.

Both cDBS and aDBS require a pair of leads to be stereotactically implanted in the basal ganglia that are used as an interface to deliver chronic high-frequency stimulation to the subthalamic nucleus (STN) or the GPi, which are the most common targets for PD.

From the patient's perspective, aDBS could provide better control of PD motor symptoms and a reduction of stimulation-related side effects (dyskinesia, dysarthria, and imbalance), and could reduce the burden associated with repeated outpatient visits to fine-tune the DBS settings, especially in the months following DBS implant. From the healthcare system perspective, aDBS could simplify patient management (i.e., simplify changes/adjustments of drugs after DBS implant, or after each programming/re-programming visit, decrease in visits and phone calls to the neurologist) and ultimately reduce the costs associated with PD management.

The expected benefit of aDBS strategy includes:

- overall reduction of patient's OFF time
- improvement of efficacy in reducing bradykinesia, rigidity, and tremor
- reduction of dyskinesia during a patient's ON time
- decreased stimulation-dependent side effects such as speech, balance, and gait problems, as well as behavioral disturbances.

3.4 Device Accessories and Components

Accessories

Catalogue Number	Image	Component	Accessory	Justification for categorising

				as an Accessory
AlphaDBSext		☐	☒	AlphaDBSext is an external programmable device for measuring the impedances of the DBS leads at the electrode-contact-level. The impedance is measured administering a fixed-parameters stimulation. AlphaDBSext can also be used for studying the subjective patient response to stimulation for a limited period of time; in fact, AlphaDBSext is able to provide DBS (current-controlled stimulation) with parameters set by the physician. This stimulation, called “Free Stimulation”, is considered an optional feature, and no medical decision arises from the

				observation of the patient response. The AlphaDBSext enables the AlphaDBSipg to be used in accordance with its intended use.
NWKstation		☐	☒	NWKstation is the external device that allows the physician to connect to and to program AlphaDBSipg. NWKStation communicates with AlphaDBSipg through a radiofrequency communication protocol (2.4 GHz). NWKstation has the possibility to be connected to an external host (such as PC and laptops) thanks to an 8 Pin Mini-Din-USB cable for streaming the recorded neural data. The NWKStation enables the AlphaDBSipg to be used in accordance

				with its intended use
AlphaDBSpat HP		☐	☒	AlphaDBSpat HP is the external patient controller that allows the patient to interact with the AlphaDBSipg, to switch the AlphaDBSipg ON and OFF, to recharge AlphaDBSipg, and to visualize the AlphaDBSipg battery level. Due to the designed recharge circuit, the AlphaDBSipg can be recharged by positioning the AlphaDBSpat Recharger Unit over the skin where the AlphaDBSipg is implanted. The AlphaDBSpat enables the AlphaDBSipg to be used in accordance with its intended use.
AlphaDBSpat LP		☐	☒	AlphaDBSpat LP is the external patient controller that allows the patient to

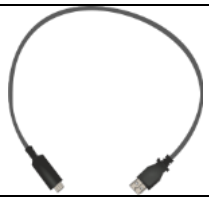
	 			interact with the AlphaDBSipg, to switch the AlphaDBSipg ON and OFF, to recharge AlphaDBSipg, and to visualize the AlphaDBSipg battery level. Due to the designed recharge circuit, the AlphaDBSipg can be recharged by positioning the AlphaDBSpat Recharger Unit over the skin where the AlphaDBSipg is implanted. The AlphaDBSpat enables the AlphaDBSipg to be used in accordance with its intended use.
AlphaDBS Screw Driver DV		☐	☒	The AlphaDBS Screw Driver DV (AlphaDBSsd) is a single-use accessory used before final IPG implantation used to fix leads extensions to AlphaDBSipg DV header

				using the stainless-steel screws. The AlphaDBS Screw Driver DV therefore enables the AlphaDBSipg DV to be used in accordance with its intended use.
AlphaDBS Screw Driver MV		☐	☒	The AlphaDBS Screw Driver MV (AlphaDBSsd) is a single-use accessory used before final IPG implantation used to fix leads extensions to AlphaDBSipg MV header using the stainless-steel screws. The AlphaDBS Screw Driver MV therefore enables the AlphaDBSipg MV to be used in accordance with its intended use.

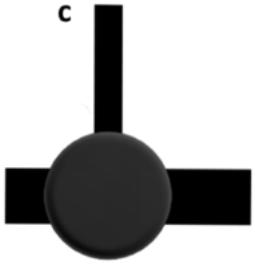
AlphaDBSlink		☐	☒	The AlphaDBSlink is classified as an accessory because it is an external device that supports communication and programming of the AlphaDBSipg. It acts as a transdecoder between the RF link and BLE interface, with a predefined neural signal data limit; any information flow below or beyond the acceptable threshold is intercepted by the AlphaDBSlink. Therefore, it supports and controls the IPG's functionality without forming part of the implantable system itself.

Components

Catalogue Number	Device Image	Component	Optional Component	Justification for categorising as a Component
AlphaDBS Adapter Plug MV		☒	☐	AlphaDBS Adapter Plug MV is a cable intended to connect the AlphaDBSext to the Medtronic Multi-lead Trialing Cable (model 355531). The latter is going to be connected to the Lead Extensions (Medtronic, model 37086), allowing the electrical stimuli to be driven from the external device to the target area.
AlphaDBS Adapter Plug DV		☒	☐	AlphaDBS Adapter Plug DV is a not-sterile cable intended to connect the AlphaDBSext to the Abbott Multi-lead Trialing Cable (Abbott, modello 3014). The latter is going to be connected to the Lead Extensions (Abbott, model 6371), allowing the electrical stimuli to be driven from the external device to the target area.
NWKpower supply		☒	☐	Power supply for NWKstation

PAT power supply		☒	☐	Power supply for PATreset
PATreset		☐	☒	In case of block or unresponsiveness of AlphaDBSpat, patient can reset the device by passing a magnet, called PATreset, on the left top corner of the AlphaDBSpat Power Bank. PATreset is a component of AlphaDBSpat.
USB-MiniDin Cable		☐	☒	MiniDin-USB adapter to connect NWKstation to an external host
AlphaDBSapp			☒	AlphaDBSapp connects to the AlphaDBSpat using a Bluetooth interface to download the data stored in the AlphaDBSpat memory and uploads to the cloud repository (WBB_database).
AlphaDBSdesk		☐	☒	AlphaDBSdesk is an application that allows the visualization and processing of two types of data: RealTime Data and Historical Data.

AlphaDBSpad		☒	☐	The AlphaDBSpad is a tablet app ecosystem for: - Providing a user interface for programming the IPG through a safe device (AlphaDBSlink) - Quick visualizing the data stored in the WebBioBank Receiving and managing notifications from the patient APP AlphaDBSpad is only a "display" of the AlphaDBSlink, since the module that controls the IPG is located in the AlphaDBSlink and not in AlphaDBSpad, AlphaDBSpad is considered a component.
AlphaDBSweb		☐	☒	The AlphaDBSweb is a web application accessible via browser that provides the interface for accessing WBB_database cloud services. The AlphaDBSweb is designed to be used by clinicians, to visualize patient and signal/data lists, to manage permission and consents, and to manage NWKstation PIN.
AlphaDBS Harness		☐	☒	AlphaDBS Harness is designed to improve correct alignment of the AlphaDBSpat and

				AlphaDBSipg during recharging. This is worn by the patient during the recharging process to improve device transportability and facilitate the alignment between devices.
AlphaDBS T-Shirt_		☐	☒	AlphaDBS Shirt is designed to improve correct alignment of the AlphaDBSpat and AlphaDBSipg during recharging. This is worn by the patient during the recharging process to improve device transportability and facilitate the alignment between devices.
AlphaDBS Clip		☐	☒	AlphaDBS Clip used to afix AlphaDBS Pat to the patient's belt.
AlphaDBS Bag		☐	☒	AlphaDBS Bag is used for storage of AlphaDBS PAT, AlphaDBS

				Harness and AlphaDBS Tshirt
iPad Case		☐	☒	It is a case provided for the protection of the iPad.

4. Risks and warnings

Contact your healthcare professional if you believe that you are experiencing side-effects related to the device or its use or if you are concerned about risks.

This document is not intended to replace a consultation with your healthcare professional if needed.

As per harmonized standard EN ISO 14971:2019/A11:2021, Newronika establishes, documents and maintains throughout the life-cycle an ongoing process for identifying hazards associated with a medical device, estimating and evaluating the associated risks, controlling these risks, and monitoring the effectiveness of the controls. Risk management process requirements set by EN ISO 14971:2019/A11:2021 has been fulfilled.

For AlphaDBS System, all the risks identified during development stage, and possibly associated to the clinical use of the devices have been mitigated through risk control measures.

After application and verification of all proposed control measures and after completion of the tests required by applicable Standards the residual risk is considered extremely limited, thanks to both decreasing harms occurrence probability and increasing in ability to apply immediately, the control measures. The risk management shows that, using design, procedure and informative risk control measures, occurrence, severity, and residual risk level remain within the acceptable limits.

After comparing the established benefits against the overall residual risk of AlphaDBS System, and since the criterion for overall risk acceptability is to have no unacceptable individual risks, the overall residual risk posed by the medical device is judged acceptable and it is deemed that the benefits of AlphaDBS System outweigh its risks.

Remaining risks and undesirable effects

The following is a list of known risks associated with the use of DBS treatment of Parkinson's disease. Note that some of these symptoms may be resolved or reduced by current steering, changing stimulation parameters, or by changing the position of the lead during surgery.

Contact your healthcare professional if you believe that you are experiencing side-effects related to the device or its use or if you are concerned about risks.

Risks Associated with Surgical Procedure and Post-Operative Period (based on data collected from similar devices):

- Allergic reaction to anesthesia or antibiotics including anaphylaxis. (4.8%, period of observation 3 yrs, Medtronic Clinical Summary 2015).
- Anesthesia/neurosurgery risks, including unsuccessful implant, exposure to bloodborne pathogens. (1.2%, period of observations 3 yrs, Medtronic Clinical Summary 2015).
- Embolism, including air embolism and pulmonary embolism (1.6%, period of observations 2 yrs, Medtronic Clinical Summary 2015)
- Haemorrhagic or ischemic stroke, immediate or delayed, which could result in temporary or permanent neurologic deficits such as muscle weakness, paralysis or aphasia (1-2% of patients implanted and is recorded as immediate complications of the surgery, Ramirez-Zamora et al., 2013).
- Injury to tissues adjacent to implant or within surgical field, such as blood vessels, peripheral nerves, brain (including pneumocephalus (5.9%, period of observation 3 yrs Medtronic Clinical Summary 2015), or pleura (including pneumothorax).
- Blood clot formation in the extremities (e.g., in the veins of the legs) (1.2%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Blood clot or air forming in or traveling through the blood stream, which can block blood flow to parts of the lungs or other tissue that could be life-threatening.
- Confusion or problems with attention, thinking, or memory (acute or chronic) (45.5%, period of observations 3 yrs, Medtronic Clinical Summary 2015).

- Death (device-related or DBS-related deaths are only reported in clinical study as complications of DBS implant procedure)
- Fibrosis (thickened skin and scarring) around the lead extension (including tightening, tethering, and bowstringing).
- Hemiparesis (muscular weakness or partial paralysis on one side of the body) (as consequence of stroke which occurs in relation to cerebral hemorrhage as reported below).
- Hemiballism (uncontrollable involuntary movements of a limb or limbs on one or both sides of the body).
- Intracranial hemorrhage (which can lead to stroke, paralysis, or death) (1-2% of patients implanted and is recorded as immediate complications of the surgery, Ramirez-Zamora et al., 2013).
- Intraparenchymal cyst (Anecdotal reporting, Ramirez-Zamora et al., 2013).
- Infection (7.5%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Injury to areas next to the implant, such as blood vessels, nerves, the chest wall, and the brain (7.5%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Injury to the nerves in the armpit (brachial plexus) leading to pain or weakness of the arm or hand.
- Pain at the surgical site(s), headache or discomfort (22.5%-44.4%-4.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Seizures.
- Speech or language difficulties (58.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Subcutaneous hemorrhage or seroma.
- Stroke (1-2% of patients implanted and is recorded as immediate complications of the surgery, Ramirez-Zamora et al., 2013).
- Swelling or bruising of the muscles or skin in the area of the lead or of the IPG implant.

Possible Side-Effects of Stimulation:

- Confusion or problems with attention, thinking, or memory (15.5%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Gait difficulty (trouble walking) and falls (58.3%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Pain (22.5% at incision site, period of observation 3 yrs Medtronic Clinical Summary 2015), headache (44.4%, period of observation 3 yrs Medtronic Clinical Summary 2015) or discomfort (4.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).

- Pneumonia from difficulty with swallowing or from inhaling fluid (pneumonia aspiration – 1.2%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Psychiatric disturbances such as anxiety (1.2%, period of observation 3 yrs Medtronic Clinical Summary 2015), depression (59.9%, period of observation 3 yrs Medtronic Clinical Summary 2015), lessened interest or emotion, hypersexuality (19.3%, period of observation 3 yrs Medtronic Clinical Summary 2015), aggression, mania or hypomania, psychosis, emotional sensitivity, sleep problems (5.9%, period of observation 3 yrs Medtronic Clinical Summary 2015), suicide, or suicidal thoughts or attempts.
- Mentation impairment such as attention or cognitive deficits (5.9%, period of observation 3 yrs Medtronic Clinical Summary 2015), memory disturbances, or confusion.
- Seizures (1.2%, period of observation 3 yrs, Medtronic Clinical Summary 2015).
- Sensory changes (paraesthesia – 7%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Speech or language problems (58.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Swallowing difficulty such as dysphasia, dysarthria or dysphagia (57.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Systemic effects such as rapid heartbeat, sweating, fever (0.7%, period of observation 2 yrs Medtronic Clinical Summary 2015), dizziness (10.2%, period of observation 3 yrs Medtronic Clinical Summary 2015), changes in kidney function, difficulty passing urine (7%, period of observation 3 yrs Medtronic Clinical Summary 2015), sexual effects, nausea (16.6%, period of observation 3 yrs Medtronic Clinical Summary 2015), difficulty having bowel movements, bloating.
- Weakness, muscle spasms, shaking, restlessness, or problems with movement.
- Undesirable sensations (e.g., tingling).
- Visual disturbances or periorbital symptoms, such as diplopia, eyelid movement difficulty, oculomotor difficulties or other visual field effects and eye-related symptoms (9.1%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Weight changes (increase – 7.5%, decrease – 5.4%, period of observation 3 yrs Medtronic Clinical Summary 2015).

Residual Risks:

- Return of PD Symptoms (bradykinesia 46%, dystonia 55%, tremor 50.3%, motor dysfunction 46.5%, period of observation 3 yrs, Medtronic Clinical Summary 2015)
- Overstimulation side effects (dyskinesia, 3.6%, period of observation 3 yrs, Medtronic Clinical Summary 2015)
- Lead explant surgery side effects
- Internal tissue damage

- Electrical shock
- User inconvenience
- Skin irritation
- Nervous tissue irreversible damage
- Tissue damage due to temperature
- Infection (7.5%, period of observation 3 yrs Medtronic Clinical Summary 2015).

Device-Related Risks are comparable to the risks:

- Allergic or immune system response to implanted materials (resulting in signs and symptoms reported below, e.g pain, redness, swelling, warmth, etc).
- Failure or malfunction of any part of the device, including but not limited to: Battery leakage, battery failure, lead or extension breakage, hardware malfunctions, loose connections, electrical shorts or open circuits, and lead insulation breaches, whether or not these problems require device removal and/or replacement (3.8%, period of observation 2 yrs, Medtronic Clinical Summary 2015).
- Implant site complications such as pain, poor healing, redness, warmth, swelling or wound reopening (1%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Implanted neurostimulator may be cause skin erosion (1.2%, period of observation 3 yrs, Medtronic Clinical Summary 2015) and/or move from original implanted location, which may lead to the need for additional surgery (1%, period of observation, Medtronic Clinical Summary 2015).
- Infection (7.5%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Interference from external electromagnetic sources.
- Loss of adequate stimulation (determining return of PD symptoms, see above).
- Pain (22.5% at incision site, period of observation 3 yrs Medtronic Clinical Summary 2015), headache (44.4%, period of observation 3 yrs Medtronic Clinical Summary 2015) or discomfort (4.8%, period of observation 3 yrs Medtronic Clinical Summary 2015).
- Skin irritation or burns at the stimulator site.
- Stiffness in muscles or joints or worsening of disease symptoms, potentially caused by loss of stimulation, medication changes, surgery, or illness. In rare cases worsening can become a life-threatening crisis associated with varied symptoms such as mental status changes, fever, and muscle rigidity.
- Swelling, including fluid collecting around the device.

Based on a Product Performance report from a commercially available conventional DBS product, adverse events associated with neurostimulator malfunction are rare (about 1.4%, or 55 events over 3,928 neurostimulators implanted from 2009 onward). In the event of a failure or malfunction, the IPG may need to be replaced. This is typically done under local anaesthesia. Such neurostimulator related events were classified as:

- High Impedance: 29 events (1% of neurostimulators implanted)
- Device Malfunction: 9 (1% of neurostimulators implanted)
- Low Impedance: 5 (1% of neurostimulators implanted)
- Premature Battery Depletion: 6 (0,3% of neurostimulators implanted)
- Electromagnetic Interference: 2 (1% of neurostimulators implanted)
- Device Issue: 1 (1% of neurostimulators implanted)
- Device Lead Issue: 1 (1% of neurostimulators implanted)
- Extension Migration: 1 (1% of neurostimulators implanted)
- Lead Insulation Failure: 1 (1% of neurostimulators implanted)

Safety warnings

Contact your healthcare professional if you believe that you are experiencing side-effects related to the device or its use or if you are concerned about risks.

- **Intracranial Hemorrhage**. Special precautions should be taken for patients who are prone to hemorrhage including patients with coagulopathy, with high blood pressure, or who are using prescribed anticoagulants. Microelectrode penetration and DBS Lead insertion can put patients who have a likelihood of intracranial hemorrhages at greater risk.
- **Electromagnetic Interference**. Strong electromagnetic fields can potentially turn AlphaDBSipg off, cause temporary unpredictable changes in stimulation, or interfere with AlphaDBSpat or NWKstation communication. Patients should be counseled to avoid or exercise care around:
    - Theft detectors such as those used at entrances/exits of department stores, libraries, and other public establishments. The patient should proceed with caution, ensuring to move through the center of the detector as quickly as possible.
    - Security screeners, such as those used in Airport Security or at entrances to government buildings, including hand-held scanners. The patient should request assistance to bypass the device. If the patient must pass through the security screener, they should move quickly through the device staying as far from the physical device as allowable.
    - Power lines or power generators.
    - Electric steel furnaces and arc welders.
    - Large magnetized stereo speakers.
    - Strong magnets.
    - Automobiles or other motorized vehicles using a LoJack system or other anti-theft systems that can broadcast a radio frequency (RF) signal.
    - Other sources of electromagnetic interference, such as RF transmitters at television or radio broadcast stations or transceivers.

- **Therapeutic Ionizing Radiation**. Electronic components in AlphaDBSipg can be damaged by therapeutic ionizing radiation. Any damage to the implanted part of the AlphaDBSipg might not be immediately detectable.
- **Heat Due to Charging**. The recharger unit, AlphaDBSpat, may become warm while charging the Stimulator. The recharger unit should be handled with care. The Patient should not charge while sleeping. This may result in a burn. If the patient experiences pain or discomfort, they should cease charging and contact their physician.
- **Stimulator Damage**. Chemical burns may result if the Stimulator housing is ruptured or pierced, exposing the patient's tissue to battery chemicals. Do not implant the AlphaDBSipg Stimulator if the housing is damaged.
- **Suicide**. Depression, suicidal ideation, and suicide are risks previously reported in relation to DBS. If the patient reports depression or suicidal thoughts, consider adjustment of stimulation, discontinuing stimulation, adjusting medication, and/or psychiatric referral.
- **Other Active Implantable Devices**. Stimulators, such as the AlphaDBSipg, may interfere with the operation of implanted sensing stimulation devices such as pacemakers or cardioverter defibrillators. The effects of implanted stimulation devices on the neurostimulator AlphaDBSipg are unknown.
- **Automobiles and Equipment**. Patients should operate automobiles, other motorized vehicles, or potentially dangerous machinery/equipment with caution after receiving the AlphaDBS System. Performing activities that would be dangerous if treated symptoms were to return, or instances in which stimulation changes occur, should be avoided.
- **Pregnancy** It is unknown whether this device may hurt an unborn baby.

Precautions

Contact your healthcare professional if you believe that you are experiencing side-effects related to the device or its use or if you are concerned about risks.

- **Device Failure.** Implants can fail at any time due to random component failure, loss of battery functionality, or component breakage. Suddenly stopping brain stimulation can cause serious reactions to develop. If the neurostimulator stops working even after complete charging, the patient should turn off the neurostimulator AlphaDBSipg and contact their physician immediately so that the system can be evaluated and appropriate medical care given to manage the return of symptoms.
- **Tissue Reaction.** Temporarily, there may be some pain in the area of the Stimulator as the incisions heal. If there is excessive redness around the wound

area, it should be checked for infection. In rare cases, adverse tissue reaction to implanted materials can occur.

- **Cell Phones.** While interference with cell phones is not anticipated, the full effects of interaction with cell phones are unknown at this time. Do not place your cell phone in your shirt pocket or directly on components of AlphaDBS System. If some interferences happen, place cell phone on the other hear or turn off cellular.
- **Patient Activities.** During the two weeks following surgery, it is important for you to exercise extreme care so that appropriate healing will secure the implanted components. During this period, you should not attempt to move heavy objects.
- **Massage Therapy.** You should avoid receiving massage therapy near the implanted system components. If you receive massage therapy, you should inform the masseuse that you have an implanted device and show him/her where the Stimulator, DBS Extension, and DBS Leads are located. You should have the masseuse avoid these areas and proceed with caution.
- **Use of AlphaDBSpat and its accessories.** Use the AlphaDBSpat and its accessories with care.
    - Do not use AlphaDBSpat and its accessories with sharp objects (pens, pencils, screwdrivers). Do not drop the AlphaDBSpat, because it may break.
    - For avoiding damage, the AlphaDBSpat and its power bank, do not submerge the devices, do not clean them with bleach or nails solvent, or mineral oil.
    - When using the AlphaDBSpat and its power supply, use special care near flammable or explosive atmospheres. An interaction between flammable or explosive atmospheres and the device or its battery can occur. The consequence of using a battery-powered device near flammable or explosive atmospheres are unknown.
    - The AlphaDBSpat is not certified for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide. The consequences of using the device near flammable atmosphere are unknown.
    - Keep AlphaDBSpat and its accessories away from kids to avoid asphyxiation and strangulation dangers. Always keep the device in its packaging when not used. The device is not intended to be used by kids or under 18 years old.
- **Exclusive use of Newronika devices and accessories.** Use only Newronika charging device and accessories to recharge your AlphaDBSipg and use only power supplier provided by Newronika for powering your AlphaDBSpat.
- **No modification of this equipment is allowed.** Modification of this equipment can result in damage to the device, causing the device to malfunction or become unusable.
- **Possible disturbances of other implanted devices.** Do not place the AlphaDBSpat above another active implantable medical device (e.g. pacemaker

or defibrillator or other neurostimulator) because the recharger unit can accidentally modify the other device functionalities.

- **Electromagnetic interferences during radiofrequency communication.** When you use the AlphaDBSpat for communicating with your implanted AlphDBSipg neurostimulator, be sure to be far away from equipment that may cause electromagnetic interference (EMI). The EMI may disturb and interrupt the communication between AlphaDBSpat and AlphaDBSipg. Example of common sources of EMI are: powerful computer monitors, cell phones, speakers and motorized wheelchairs. All these sources should not be placed near the neurostimulator or the AlphaDBSpat because they may cause the system to turn on or off.

The AlphaDBS must be turned on only by duly trained healthcare personnel that will be in charge of setting the programming parameters. The referral medical doctor will thoroughly assess the patient's clinical response to DBS treatment before discharging him/her and planning further monitoring visits.

Post-implant clinical visits will be conducted in agreement with standard-of-care for PD patients receiving DBS therapy. No specific follow-up visits are foreseen after AlphaDBS implant.

5. Summary of clinical evaluation and post-market clinical follow-up

DBS is an established treatment for Parkinson's Disease and the AlphaDBS is a system delivering stimulation according to modern technological standards. Therefore, this clinical evaluation is based on a review of the available literature on equivalent CE marked devices delivering DBS, as well as on the currently available clinical data collected with the AlphaDBS system.

DBS is considered a safe and effective therapy, with a favourable risk/benefit balance. Most severe DBS-related adverse events (AEs) occur as a direct consequence of surgery or during the immediate (<30 days) postoperative period. The commonly experienced AEs are either procedure-related AEs or device-related AEs. Long-term studies indicate that major complications (including intracranial haemorrhages, lead and extension fractures, or lead migration, lead cable and IPG infections requiring removal and lead replacements) occur in about 15% of patients. A recent study characterizing reports of complications from DBS for Parkinson's procedures over a 10-year period showed an overall infection rate of 16.2%. However, the rate of surgical and post-surgical complications of the procedure are acceptable even compared to more common surgical procedures.

Clinical trials, meta-analyses, and reviews show that the three cardinal signs of Parkinson's disease (tremor, bradykinesia, rigidity), as well as medication-induced dyskinesias all benefit from DBS. All studies showed a significant reduction of motor symptom severity in the on stimulation/off medication condition after surgery when compared with the off-medication condition before surgery when measured with the motor section of the Unified Parkinson's Disease Rating Scale (UPDRS Part III). The most recent meta-analysis published on the topic reports an average improvement of 50.5% in the UPDRS III motor score. In controlled studies the reduction varied between 25% and 41%. Long-term follow-up studies of up to 10 years demonstrate that a considerable proportion of the patients maintain such improvements in the long-term. The efficacy of DBS on some symptoms like gait, freezing of gait, speech impairments in the long-term seems to be less relevant but overall quality of life (QOL) are consistently reported to be improved out to beyond 10 years post-implant

Some studies addressing the possible issues and complications related to hybrid systems (e.g., connecting hardware parts from different manufacturers) consistently concluded that switching between different DBS technologies and manufacturers is safe, and it does not affect DBS efficacy on patients. All manufacturers offer solutions to connect their IPG to a competitor's leads and extensions.

A recent study entitled "Safety and Efficacy of Adaptive Deep Brain Stimulation" (ClinicalTrials.gov Identifier: NCT04681534) conducted by Newronika showed that cDBS delivered through the AlphaDBS System is comparable, in terms of clinical efficacy and safety, to cDBS delivered through the most commonly used DBS system on the market

(Activa PC, by Medtronic). The average improvement in UPDRS III scores between MedsOFF/StimOFF and MedsOFF/StimON with the Medtronic Activa system was 33.7 (55%) points and with the Newronika cDBS was 38.2 (61%) points. Results indicate a trend with an average difference of -3.9 points and an effect size (Cohen's d) of -0.35, suggesting a small difference in favor of the Newronika cDBS.

In the same study, Newronika also compared the clinical efficacy of cDBS to aDBS, showing that the two modes provide the same clinical efficacy with an average UPDRS III improvement of cDBS MedsOFF/StimOFF vs MedsON/StimON of 42.4±19.6 (67%) vs 40.1±19.6 (66%).

Considering that (1) DBS has shown an acceptable safety profile in many short- and long-terms follow-up studies, (2) risks regarding electrical hazards, use errors, biological hazards have been minimized in the same way as other implantable devices manufacturers, (3) recommendations from existing evidence-based guidelines to minimize residual clinical risks are available to end-users, (4) the use of hybrid systems does not affect the safety and efficacy profile of DBS, and (5) the use of AlphaDBS System did not produce any unexpected device-related serious adverse events during the study follow up. Data on the AlphaDBS system in addition to the CE Mark approval for its cDBS mode support the claim that AlphaDBS should be considered to be as safe as other DBS devices on the market in both cDBS and aDBS modes.
Moreover, considering that: (1) studies conducted with other devices have shown that cDBS is associated to not uncommon side effects which may be reversible, (2) other cDBS devices share with the AlphaDBS System the same principles of operations and physical characteristics, additional clinical data on the AlphaDBS System are not likely to add evidence related to side effects.
Finally, considering that: (1) studies conducted with other devices have demonstrated that DBS produces a significant reduction in PD motor symptoms in the short- and long- term, (2) other DBS devices share with the AlphaDBS System the same intended use, clinical applications, principles of operations and physical characteristics, (3) cDBS delivered through the AlphaDBS System has a similar efficacy of an equivalent device (Medtronic Activa), and (4) aDBS and cDBS delivered with AlphaDBS System show an equivalent efficacy, additional clinical data on AlphaDBS System are not likely to add evidence on the efficacy of cDBS provided by literature.
In conclusion, based on the available literature review on equivalent devices, and on available data from pre-market and post-market studies with the AlphaDBS System in conventional and adaptive mode, there is reasonable assurance that AlphaDBS has an acceptable profile in terms of clinical efficacy and safety in subthalamic (STN) DBS Therapy for Parkinson's when used in connection with commercially available leads such as those manufactured by Medtronic in accordance with indications of use.

During 2022, the company continued the implementation of the activities defined in its 5-year PMCF plan. Since the company did not start device commercialization, activities concentrated on:

1. The Implant registry: the Company designed the AlphaDBS System implant registry together with domain experts. The design has been submitted to FDA for assessment since the Company aims to use it for international clinical study.
2. Analysis of long-term performance of AlphaDBS system, with particular focus on the recording function: This activity has partially been implemented in the context of a clinical study aimed at comparing an innovative stimulation mode (defined as adaptive DBS or aDBS) against an active comparator (constituted by the conventional DBS mode), both delivered by AlphaDBS System.

Since the study uses the Device Under Evaluation, that is constituted by the CE marked AlphaDBS System with the additional feature of implementing aDBS (that uses as feedback variable LFPs).

6. Possible diagnostic or therapeutic alternatives

When considering alternative treatments, it is recommended to contact your healthcare professional who can consider your individual situation.

Management of PD patients

There is no disease-modifying therapy for PD. Different medical and surgical alternatives are currently available to control motor and non-motor symptoms associated to PD.

In addition, a number of non-pharmacological treatments are available (physiotherapy speech therapy, tai-chi, etc.).

Medical treatment

Medical therapy for motor symptoms has been primarily focused on restoring dopamine levels through the administration of levodopa, dopamine agonists, or monoamine oxidase B (MAO-B) inhibitors. Current standards for patient care recommend dopamine agonist or levodopa as the first line of therapy for the symptomatic control during the early, uncomplicated stages of PD.

Other medical therapy may be used to treat multiple symptoms of PD.

The following are the main pharmacological classes of drugs currently used to treat PD.

- Dopaminergic drugs
- Dopamine agonists
- Catechol-O-methyltransferase (COMT) inhibitors
- Anticholinergic Therapies

- monoamine oxidase B (MAO-B) inhibitors

Surgical treatments

Surgical treatments have been typically reserved for patients with severe motor impairment from PD and motor complications in the form of fluctuations and dyskinesias (Goetz et al., 2005).

Surgical treatment aims to correct the imbalance created by the diminished function of the substantia nigra. Surgery alters, through either destruction or electrical stimulation, the function of brain nuclei - such as the thalamus, globus pallidus or subthalamus - that interact functionally with the substantia nigra (NICE, [IPG19], 2003).

Current available surgical treatments for PD are listed in below table.

- Bilateral STN cDBS
- Bilateral GPi cDBS
- Unilateral pallidotomy
- Unilateral thalamotomy
- Thalamic stimulation (uni or bilateral)
- Subthalamotomy

Deep Brain Stimulation

Conventional DBS is an established treatment for advanced PD. The US Food and Drug Administration approved DBS as a treatment for Parkinson's disease in 2002. DBS consists of delivering chronic high-frequency stimulation through electrodes neurosurgical implanted in the basal ganglia and connected to an IPG positioned in the supraclavicular region. The GPi and the STN are the most common targets for DBS.

Despite the fact that DBS of both the GPi and the STN were approved for the treatment of PD, the STN has been the target of choice for most neurosurgeons and neurologists.

Conventional DBS is characterized by hardware components, mode, and pattern of stimulation that did not change over time (since the first applications in the 1990s). The IPG implanted in the STN delivers continuous stimulation resulting in a spherical shape of the electric field around the electrodes (Aström et al, 2009). Stimulation settings for chronic conventional DBS (lead contact/contacts, stimulation mode – monopolar/bipolar, frequency, voltage, pulse width, and polarity) are decided based on screening of the four electrode contacts for effect and side effects, during the programming phase that take places around two weeks after stereotactic neurosurgery for electrode implant. This procedure is sometimes a laborious exercise for the programming clinician and the patient

and may need incremental repetitive adjustments after surgery, over periods of weeks and months in some patients.

The NICE guidelines suggest considering cDBS for people with advanced PD whose symptoms are not adequately controlled by best medical therapy (NICE, [IPG19], 2003).

7. Suggested training for users

AlphaDBS System has three main types of users.

1. PD patients with DBS implant and their caregivers who will use the AlphaDBSpat to recharge their neurostimulator (i.e. AlphaDBSipg).

2. Caregivers who will use the AlphaDBSpat to recharge the patient's neurostimulator (i.e. AlphaDBSipg).

3. Physicians (neurologists and neurosurgeons, DBS experts):
    - DBS expert neurologists and neurosurgeons will use NWKstation to program the AlphaDBSext and the AlphaDBSipg.
    - DBS expert neurosurgeons will implant the AlphaDBSipg and will connect it to DBS lead extensions.

Patients implanted with the AlphaDBSipg are expected to use only the AlphaDBSpat in their domestic environment to recharge the implantable device. The other subsystems of AlphaDBS System are intended to be used by physicians only.

PD patients

- Age: the mean PD age of onset in 58-60 year, so usually PD patient are elderly
- Gender: based on epidemiology, the prevalence of PD is slightly higher in males
- Linguistic and cultural background: various
- Professional competence: various
- Strength and stamina: very low due to PD symptoms
- Physical dexterity, flexibility, and coordination: very low due to PD symptoms
- Cognitive abilities: long term PD is often associated with cognitive, including memory, impairments. However, the reference guidelines (CAPSIT-PD guidelines) recommend to evaluate cognitive status as part of the pre-surgical visit in de novo DBS patients and to exclude patients with severe decline. Furthermore, neurologists consider that rechargeable DBS systems are appropriate only for patients with a relatively good cognitive status. Therefore, we can consider that AlphaDBSipg will only be implanted in patients showing good cognitive performances.

- Mental and emotional state could be compromised. Anxiety and related emotional states could worsen PD symptoms. However, the reference guidelines (CAPSIT-PD guidelines) recommend to the patient psychiatric status as part of the pre-surgical visit in de novo DBS patients and to exclude patients that are more likely to have psychiatric side effects.
- Literacy and language skills: various but depending on disease level. PD patients could have limitations in to speaking properly
- General health status: compromised. PD is a neuro-degenerative disease that worsen over time
- General knowledge of similar types of devices: not very high considering they are approaching DBS treatment for the first time. This aspect could vary for patients that have a previous implanted DBS rechargeable system.
- Willingness and motivation to use a new device: could be various but in general patients could be highly motivated in using a new device to improve their quality of life
- Ability to learn and adapt to a new device: in the immediate post-surgical period patients could experience discomfort and pain. Abilities to learn new task and technological device could be limited by age related issues.

Level of training that patients are expected to have and/or to receive: patients are expected to receive exhaustive and detailed training, before starting to use the AlphaDBSpat and information sheet in lay language. Physicians are expected to train their patients about the use of the device in a domestic environment, especially for what concerns the daily recharging sessions. If the patient is not able to manage the device by itself, caregivers shall be train as well to support the patient.

Caregivers

- Age: typically, caregivers are family members of the PD patient (e.g. partner or sons/daughters). As the mean PD age of onset around 60 years, PD patients' partners are often elderly.
- Gender: typically, caregivers are most often females
- Linguistic and cultural background: various
- Professional competence: various
- Strength and stamina: could be lower due to elder age
- Physical dexterity, flexibility, and coordination: could be lower due to elder age
- Cognitive abilities: could be lower due to elder age
- Mental and emotional state: should be normal
- Literacy and language skills: various
- General health status: could be compromised due to elder age

- General knowledge of similar types of devices: not very high considering they are approaching DBS treatment for the first time. This aspect could vary for caregivers of patients with an implanted DBS rechargeable system and will be evaluated.
- Willingness and motivation to use a new device: could be various but in general caregivers could be highly motivated in using a new device to improve the quality of life of the cared one
- Ability to learn and adapt to a new device: abilities to learn new task and technological device could be limited by age related issues.

Level of training that users are expected to have and/or to receive: caregivers are expected to receive exhaustive and detailed training, before starting to use the AlphaDBSpat and information sheet in lay language.

Project	AlphaDBS System	**Phase**	Post-Production Phase
Subsystem	Overall system	**Document type**	Summary of safety and clinical performance
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Revision history

SSCP Ver. number	Date issued	Change description and modified paragraph	Revision validated by the Notified Body
1.0	14/03/2023	First document release	☐ Yes Validation language: English ☐ No
2.0	21/12/2023	Document update	☐ Yes Validation language: English ☐ No
3.0	16/01/2024	Document update	☐ Yes Validation language: English ☐ No
4.0	09/08/2024	Document update	☐ Yes Validation language: English ☐ No
5.0	14/07/2025	Document update	☐ Yes Validation language: English ☐ No